

**LISTING OF THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-20. (Cancelled)

21. (New) A thermal protection system, comprising:

an insulating core comprising carbon foam having a thermal conductivity below about 1 W/m °K; and

an antioxidant protective layer over a surface of said insulating core.

22. (New) The thermal protection system of claim 21, wherein the carbon foam is coal-based carbon foam.

23. (New) The thermal protection system of claim 21, wherein the carbon foam has a density ranging from about 0.1 g/cc to about 0.8 g/cc.

24. (New) The thermal protection system of claim 21, wherein the carbon foam has a compressive strength up to about 6,000 psi.

25. (New) The thermal protection system of claim 21, wherein the carbon foam is carbonized carbon foam.

26. (New) The thermal protection system of claim 21, wherein the carbon foam has been impregnated with at least one selected from the group consisting of petroleum pitch, epoxy resins, and polymers.

27. (New) The thermal protection system of claim 21, wherein the carbon foam comprises an inert solid material.

28. (New) The thermal protection system of claim 27, wherein the inert solid material comprises ceramic particles.

29. (New) The thermal protection system of claim 21, wherein the antioxidant protective layer comprises a coating of a metal.

30. (New) The thermal protection system of claim 29, wherein the metal is selected from the group consisting of aluminum and inconel.

31. (New) The thermal protection system of claim 21, wherein the antioxidant protective layer comprises a coating of a glass-forming compound.

32. (New) The thermal protection system of claim 31, wherein the glass-forming compound is selected from the group consisting of a metal halide, metal carbide, and metal nitride.

33. (New) The thermal protection system of claim 21, wherein the antioxidant protective layer is incorporated into the carbon foam.

34. (New) The thermal protection system of claim 21, wherein a surface of the insulating core is positioned over a structure.